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The Evaluation of Four Mind/Body Intervention Strategies to Reduce Perceived Stress among College Students

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Abstract

We examined the effectiveness of four distinct mind/body interventions on reported perceived stress, anxiety, and health promoting behaviours in college students. Ninety students were randomly assigned to one of four experimental groups (i.e., nutritional, exercise, relaxation, or cognitive behavioural therapy). There were approximately 18 students per experimental group and 18 participants in the control group. All five groups completed four pre-assessment instruments (i.e., the Symptom Checklist-90-Revised (SCL-90), Spielberger State-Trait Anxiety Inventory (STAI), the Perceived Stress Scale (PSS), and the Demographics and Health Habits Survey). Upon completing their respective 6-week intervention programs, 70% of the participants returned to complete the post-assessment. ANOVA results indicated that the nutrition education and relaxation response modalities produced the greatest improvement. Overall, all the mind/body training methods proved to assist college students in their perceived levels of stress. We conclude with a number of recommendations for future research.

A related study on college students has shown that a stressful life was linked to anxiety and depression (Sergin, 1999). In their study of college students, Dixon et al. (1992) found that stress can be a predictor of suicidal tendencies and a sense of hopelessness. Meanwhile, other studies have focused on the relationship between stress among college students and various health related issues (see Naquin & Gilbert, 1996). Even basic ailments such as increases in headaches, depression, and sleep disturbances (Ginsberg, 2007), and the common cold (Stone et al., 1992) have been found to be associated with college student stress.

Collectively, these findings paint a dramatic picture as to the nature, extent and potential impact of stress on college students. Hence, an effective approach to coping and managing ones' stress in college/university populations is not only called for but a social responsibility on behalf of such institutions as they have a vested interest in the success of their students. Furthermore, since post-secondary institutions generally have limited resources for mind/body initiatives and that students have even fewer resources for managing their life while attending school, it is important to help both students

and schools to optimize their choices and/or allocation of resources or support.

The present study broadened the mind/body stress intervention techniques used in the Deckro et al. (2002) study. We examined independently the relative effectiveness of the four models of intervention. The models included: physical exercise in the form of aerobic exercise and strength training; nutrition education; trained relaxation response techniques; and cognitive behaviour therapy. In addition, to assessing the relative effect of the 6-week four mind/body interventions a randomized control group was also used.

The purpose of the study was to examine the individual relative effectiveness of four different stress reduction modalities on college students living in a major urban centre in western Canada. We hypothesized that Canadian college students who participated any one of the four 6-week, one-hour intervention sessions would demonstrate reductions in their psychological distress, anxiety, and the perception of stress to a greater extent than individuals in the control group. We also hypothesized that there would be differences among the four experimental groups, although directional hypotheses were not possible since these interventions have not been studied collectively and independently before. Finally, we also investigated students' general perceptions about the intervention program through the use of a reflective diary.

METHODS

Outcome Measures

The study included four major outcome measures to observe changes in the perceived levels of stress and/or anxiety among students as well as health promoting behaviours. The primary measure included the Global Severity Index (GSI) of the Symptom Checklist-90-R (SCL-90). Secondary measures designed to measure changes in stress/anxiety as well as health promoting behaviours included the Speilberger State-Trait-Anxiety Index (STAI), the Perceived Stress Scale (PSS-14), the Health Promoting Lifestyle Profile II (HPLPII), and the Demographics and Health Habits Survey (see Appendix A). These measures were also used in Deckro et al. (2002) and have proven reliable and valid scores. In addition, the physical exercise and nutrition education components included their own specific scales to further enrich the quality of the data obtained and/or ensure the safety of students' participation. For example, in the physical exercise group participants completed a Par-Q questionnaire¹ which was used to pre-screen the general suitability of a participant to engage in physical exercise while the participants in the nutrition education group completed 3-day food records² which was used to help evaluate the nutritional habits of the students.

Participants and Procedure

Upon receiving ethical approval from the College's Ethical

Review Board, research participants were solicited through several means. Student solicitation included sending emails containing information on the study out to all registered students; distributing information flyers on campus; visiting a variety of different classrooms, and placing a number of large banners in highly visible locations around campus.

To be eligible for study participation, students needed to be between the ages of 18-65 and available to attend 6 weekly one-hour intervention sessions and complete a pre and post assessment package. As part of the pre-assessment package, students completed a "disclosure and consent form" and were informed that they would receive a \$25 honorarium for completing at least 4 of the 6 intervention sessions as well as the pre-and post-assessment. Students also received an information binder comprised of literature specific to stress and the college students, weekly information handouts, and a personal journal to reflect on their feelings and perceptions as they participated over the study period. Participants were also offered two free movie passes if they referred anyone.

Using a random numbers table, 91 participants were randomly assigned to one of the four interventions or to the control condition. All the Team leaders for each of the intervention modalities were professionally qualified to conduct their respective sessions.

The four experimental groups were divided over two days – Tuesdays (i.e., exercise and nutrition) and Wednesday (i.e., relaxation and cognitive). With the exception of the control group, all four intervention strategies were approximately 60-minutes in length and included the following procedures:

- Lecture/presentation of weekly stress management module,
- Discussion and demonstration of new aspect of the intervention modality,
- Engagement in the weekly activity pertaining to mind/body relaxation skills, and
- Brief summary of the session.

All participants were encouraged to practice the skills they learned a minimum of 2-3 times during the intervening week. All students were given a "Personal Reflective Journal." The journals were offered as an optional educational tool to all participants and they were invited to submit their daily logs or summary at the end of the 6 weeks.

Upon completing the final intervention session, participants were reminded to attend the post-assessment session which was one week after the final intervention session. After participants completed the instruments at the post-assessment sessions, the financial honorariums and movie passes were distributed to the participants.

RESULTS

Demographics and Health Habits Survey

Initially 91 students registered for the study. By the end of the 6-week session and upon completion of the post-assessment instruments, 71 (78%) of the original participants completed at least 4 sessions and the pre-/post-assessments. Of those who completed all aspects of the study 56 (78.9%) were female and 15 (21.1%) were male. The majority (80.3%) of the participants were between the ages of 18-24. Sixty-four percent of the respondents were either first or second year students and less than 15% had more than 4 years of post-secondary education.

Only 26.8% (N=19) of the respondents described their financial situation while attending school as: "somewhat challenging to meet my monthly expenses." They also generally felt that they had someone they could talk to "fairly often" or "almost always" (N=49; 69%) about matters that were important to them. Exercise was not a common outlet or activity for most of the students as they reported that they averaged less than 3 workouts per week and they only scored average (i.e., "fairly often" – 36.6%) when asked how balanced their diet was. In light of this information, most of the participants (68%) indicated that they felt optimistic about "future prospects of career success."

Statistical Analysis ³

Data were analyzed using independent t-tests to measure if the mean scores between the groups varied between the pre- and post-test. In addition, we used one-way repeated measures analysis of variance (ANOVA) to explore simultaneously the variance between the four groups and in comparison to the control group with the variability within each of the groups. As we were not able to collect post-assessment information on those who dropped out, we were unable to determine if they were any different from those who stayed. Several of the participants offered reasons for their withdrawal and they virtually all involved 'legitimate' reasons such as lack of time, getting injured, or unforeseen events. We used SPSS statistical software (version 15.0) to analyze the data.

Outcomes

Thirteen participants completed both the pre- and post-assessment for the control group and a total of 58 participants completed all four of the pre- and post-assessment among the four experimental groups (exercise = 14, nutrition education = 17, relaxation response = 12, and cognitive behavioural therapy = 15). We used data only from students who successfully completed all items on both the pre- and post-training assessment.

As indicated in Table 1 the mean scores between the intervention groups (pooled data from all intervention groups) and control group did not vary significantly on the pre-assessment

instruments but the differences in the mean scores for the post-assessment instruments were generally greater for the intervention groups than the control group indicating that the stress reduction interventions produced a change across some of the instruments while there was no observable change in scores for the control group.

Table 2 shows that for the Exercise group (Group 1) the SCL-90-R (GSI) was the only instrument which showed a statistically significant change from pre- to post-assessment. For the nutrition education intervention group (Group 2), two of the instruments (i.e., Demographics and Health Habits Survey and PSS-14) revealed statistically significant changes for the participants. Similarly for the relaxation response intervention group (Group 3) two of the scales (i.e., Demographics and Health Habits Survey and SCL-90-R) showed statistically significant changes between the pre- and post-assessment. Finally, only the STAI Y1 & Y2 scale revealed a positive change for the cognitive behaviour group (Group 4). Hence, although the sample sizes were small, all four interventions proved to produce a measurable positive change in alleviating student stress on one or more of the outcome measures as compared to the control group which had no changes across any of the four scales from the pre- to post-assessment period. The differences in change scores was statistically significant at $p < .05$ or greater.

Table 1

Pre- and Post Intervention Score Means and Change Score Means for the Outcome Variables: Health Promoting Lifestyle Profile II (HPLPII), Perceived Stress Scale (PSS), the State-Trait Anxiety Inventory (STAI) and Symptom Checklist – 90 Revised (SCL-90-R)

Table 2

Mean Differences and Significance Across All Groups by the Outcome Variables

Qualitative Analysis

Qualitative responses were received from all four of the experimental groups. Five general questions were provided. They ranged from inquiring about any gains the participant might have received/learned through their participation in the six-week program; what the specific benefits of participating in the study might have been; what challenges, if any, did they experience in their assigned intervention; any recommendation for the research team; and any "additional comments."

The response/feedback rate across the four intervention groups was, on average over 80%. Overall, the comments from the respondents of all four intervention models were very positive. Students expressed an appreciation for the quality of information shared and conveyed that they learned a number of health promoting and stress reducing strategies. A number of the respondents noted that they had acquired specific skills to better help them recognize

and cope with their stress; that they generally felt better after completing the 6-week program; and that they would try to incorporate what they learnt into their lifestyle so as to better deal with the demands of school.

The biggest challenge for the participants was finding the time to complete the sessions and/or finding time throughout the week to practice what they had learned.

Conclusion

The literature clearly illustrates that stress has become an almost endemic characteristic of our daily life, especially that of college/university students. It is also an aspect of student life that has gone largely unaddressed (e.g., outside of schools providing basic information via website, information pamphlets, etc. to students). This study represents one of the first of its type, if not the first study of its type in Canada to measure the impact of four mind/body intervention and educational strategies perceptions on perceptions of stress among college students and their perceptions of the programs.

Our findings indicated that the 6-week mind/body intervention program that focused on physical exercise, nutrition education, relaxation response or cognitive behavioural therapy, had a positive impact on reducing self-reported psychological distress, anxiety, and perceptions of stress as well as a positive influence on health promoting lifestyle behaviour among a group of Canadian college students.

Our qualitative data lent further support to our quantitative findings in that students' perceptions of the intervention programs were positive.

Based on our findings we have several recommendations. First, replication and expansion of the present study will lead to a clearer understanding of differences and effectiveness of stress interventions for college/university students. Second, post-secondary institutions can significantly support their students through programming and fostering the development of stress management skills and those related to coping effectively with the demands of school. Aside from the obvious benefits to the student, such strategies could potentially lead to significant wellness impact in the workplace and on our health care system.

In the current state of the Canadian medical system and the astounding annual costs associated with the health care system, it is of utmost importance that preventative measures are implemented to improve and promote the physical and psychological health of students attending post-secondary institutions. Through participating in a study such as ours, students gained knowledge not only specific to their respective intervention but also, general strategies for stress reduction which may impact how they manage personal stress and

anxiety in the future.

Finally, future studies should explore the relative impact and effectiveness of the different intervention modalities to determine if there are gender differences, under what circumstances they might be most effective, and which ones might have longevity in changing student behaviours.

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Appendix A

The Symptom Checklist – 90 Revised (SCL-90-R) as Deckro et al. note “is a widely used standardized psychological inventory measuring current psychological distress” (p. 283). The instrument is comprised of 90 questions, each rated on a 65-point Likert-type scale which reflect increasing levels of distress ranging from not at all (0) to extremely (4). The instrument yields three global indices of distress (i.e., Global Severity Index (GSI), Positive Symptom Distress Index, and Positive Symptom Total). Consistent with the Deckro et al. (2002) study we also used the GSI. As reported by Deckro et al. (2002): “internal consistency coefficients for SCL-90-R subscales are satisfactory, ranging from .79 to .90. Test-retest reliability is in the range of .80 to .90” (p. 283). As the Ns were small we did not differentiate between males and females as the means and standard deviations among the general population was not significant (Derogatis, 1994).

The ((Speilberger State-Trait-Anxiety Index (STAI) is a self-reported anxiety instrument which includes 20 “state” and 20 “trait” statements. State anxiety refers to how participants feel at the moment, whereas trait anxiety is a measure of how they generally feel. The range of responses include: (1) not at all to (4) very much so. Deckro et al. (2002) reported the test-retest reliability for the state scale ranges from .16 to .62 and is higher for the trait scale, which ranges from .65 to .86.

The Perceived Stress Scale (PSS-14) consists of a 14 items self-report scale that measure the degree to which situations in one's life are perceived as stressful (Deckro et al., 2002). As with the STAI, respondents rate each question on a 5-point scale on how often they felt a certain way. The scale ranges from never (0) to very often (5). Internal consistency coefficients for the PSS range from .84 to .86,

and test-retest reliability is .85.

The Health Promoting Lifestyle Profile (HPLPII) is comprised of 52 questions, each rated on a 4-point scale. In the study, we referred to the survey as the "Demographics and Health Habit Survey". The questions are designed to measure health-promoting behaviours. The survey includes six subscales, which are: health responsibility, interpersonal relations, nutrition, physical activity, spiritual growth, and stress management. As reported in Deckro et al. (2002), reliability coefficients for the subscales range from .702 to .904.

1. Reprinted with permission from the Canadian Society for Exercise Physiology. <http://csep.ea.forms.asp>
2. Participants completed two 3-day food records, each including 2 weekdays and 1 weekend day, in the first and final week of the study. Participants were carefully instructed on accurate food record completion using visual tools such as three dimensional portion size measurement aids and common household measuring utensils. In addition instruction was provided on how to complete the written portion of the food records. Participants were not required to weigh foods but were asked to measure the volume of foods consumed with household measurements (cups, tablespoons) or to indicate the weight of commercial products when it was possible to assess portion sizes. Diet Analysis+™(version 8.0; Thomson Wadsworth, Belmont, CA) computer program was used to determine mean daily nutrient intakes. Further details can be obtained by contacted the principal investigator.
3. We would like to acknowledge the assistance of Nikki Thompson with the data analysis

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